"A New Empirical Method For Business Intelligence And Performance Estimation"

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Introduction and Background:

Having rapid growth in technologies, the Business Intelligence (BI) market is growing too, which forces the businesses to implement their offerings to the needs of the customer requirements. Implementation of Business Intelligence technique has become one of the most significant technological as well as organizational modernisms in decision-making processes [1].

To make world better place, businesses help to serve someone's requirements in productive manner. Recording the business activities can be maintained using electronic media and then those activity records become data. In addition to that data can be gathered through the customer's responses and using industry as a whole can also collect data. How a business can be functioned can be based on those data analysis and mining of those data using special tools and techniques to form patterns and intelligence [2].

Business intelligence (BI) comprises tools and techniques for collecting, analyzing, visualization to help executive to make any decision in the industry. Data mining comprises statistics and machine learning techniques to develop decision-making models from row data [2]. Monitoring any business environment for its performance may help in adjusting future plans that is the today's business need and these monitoring includes industry, competitors, customers and the supplier. And the main method is to develop a scorecard to track its own health as well as vitality. Employers can decide, what they want to track based on their key performance indexes (KPIs), or (KRAs) Key result areas, there is a need to have customized reports designing to meet employer's requirement. And finally these reports can be then converted into customizable dashboards that help to understand the information easily (Easy-to-Grasp format) [2]. Business Intelligence (BI) is a set of Information Technology solutions, which comprises of tools for collecting, analyzing, reporting information to the user about performance of organization and its environment.

Digital data made organizations to learn more about their businesses and use that knowledge directly for improving performance and decision-making. Analytics either

can be reactive or proactive. Where using business intelligence tools can do reactive analytics and using predictive modeling, text mining, optimization, and forecasting and statistical analysis can do proactive analytics [8].

Review of Literature and Development:

Researchers have been using different techniques in improving business strategies by having boardroom discussions. In addition to that these discussions are now frequently helped in mining strategies. To predict efficient business strategies as well as business patterns business can use Artificial intelligence (AI), Machine Learning (ML). Other than this, now cognitive analytics can be a method that could change how business intelligence can be perceived. Researchers are now trying to emulate the human brain and then train the computer to think accordingly [3].

Cognitive Computing

The processes of stimulating human thought in a computerize model is the cognitive computing. Cognitive computing comprises self-learning systems, which use data mining, pattern recognition to mimic the way of human brain function. The purpose of having cognitive computing is to develop automated IT system, which will allow problem solving without having human involvement. Cognitive computing techniques frequently acquire knowledge from the data inserted into them by mining data for information. The techniques improve the way they look for patterns as well as the way they process data hence they become capable of anticipating new problems as well developing potential solutions. However they require deep domain knowledgeable expertise, instead of replacing human experts, cognitive computer system act as a decision support system and help them take better decisions based on the data available, whether in finance, healthcare or customer service [3].

Artificial Intelligence

Computer science has one domain known as AI (Artificial Intelligence) that focuses on development of systems that the way function as human think, the ways human act, think rationally and act rationally. Since a very long time, there has been a vast focus on development of automated systems, which can accomplish the job that a human mind can accomplish. Artificial Intelligence tries to emulate a human brain

and makes decisions just like a human brain can function in particular situation. Artificial Intelligence alone is too vast field. It has different sub-domains that can help us explore business intelligence systems. Machine Learning (ML) as well as Data Mining (DM) algorithms are techniques that assist researcher analyze huge amounts of data. ANN (Artificial Neural Networks) is also one area, implementing that area researchers are trying to develop computational models, which is useful in machine learning and pattern recognition [3].

Machine Learning

Machine learning is engineering systems, which can be learned based on experience and recognizing different trends in the data. The strength of any business is to use its data efficiently to increase the performance. A suitable algorithm is necessary which maps the available data to the requirements of the business. Machine learning algorithms can be categorized in two types: Supervised learning and another is unsupervised learning algorithms. Supervised Learning algorithms are those that operate on labeled data, whereas unsupervised learning algorithms are those that run on unlabeled data [3].

Artificial Neural Networks

ANN (Artificial Neural Network) is the process of stimulating human brain. ANN recognizes the pattern in data when they are trained on sample set of data. The use of Artificial Neural Network has got increase as tool for predicting and forecasting business. Artificial Neural Network is useful when the business is having complex data. Artificial Neural Network is very efficient and robust for complex functional relationships as well as data-driven non-parametric techniques [3].

Data Mining

Data mining techniques can be used in order to get goal of predictive and descriptive from the following data-mining task:

1. Classification: This can be used discover predictive learning function that is used to classify a data item into one of the different predictive classes.
2. Clustering: This is a process of making groups of abstract object into classes of similar object.

3. Regression: The process of discovery of predictive learning function that can be used to map data item to a real-value prediction variable.
4. Summarization: It is an additional task that involves techniques for finding a compact descriptive for a set of data.
5. Dependency Modeling: it is a process of finding local model, which describes significant dependencies between variables.
6. Change and Deviation Detection: Discovering the most significant changes in the dataset.

Business Intelligence

Business Intelligence can be used get the following benefits [9]:

1. Business intelligence tools can be used to financial risks.
2. BI can also used to find the best new business patterns
3. Strategic framework to implement Business Intelligence for an organization.
4. BI can be used for decision support and risk management.
5. Data collection strategies to find relevant information.
6. Adaptive analysis for meeting sudden requirement.
7. Mining of new business opportunities from huge volume of data by using rational extraction methods.

Purpose of Study:

In this research work, we demonstrated the ability to efficiently improve the business performance. The concept Business Intelligence (BI), Business Intelligence and Analytics (BIA) and Business Analytics (BA) can be confusing and sometimes synonym. Where BI is a collection of tools and techniques for collecting, analyzing, visualization to help executive to make any decision in the industry [2][4].

In case of analytic is the process of designing actionable insights by using problem definition and the application of statistical models as well as analysis of existing and future simulated data [4]. Therefore the area of business analytics aims to apply analytical methods in data in order to create efficient and insightful resolutions to day-to-day business issues [4]. And Data mining can be used to improve the functionality of the domain by analyzing the particular dataset.

Business Intelligence (BI) can be used for analyzing tool for representing information whereas Business Analytics (BA) highlights on information insight than the data management. These days, both the academicians as well as practitioners are applying analytic in the decision-making process using integrated data [4].

Business Intelligence and Analytics (BIA) is a combination of BA and BI technology helping in decision-making systems. It is a combination of technology, technique, system, practice, methodology and application [4]. Implementing BIA techniques in an organization can assist analyzing tools for representing information and can also help in emphasizing insights of information that will help in efficiently enhancing the performance of business and its services and also allows manager to make decision for future plans.

Objective of Research:

In this study, we try to address the capabilities of Business intelligence and its applications to the business environment; we will be suggesting a model for cognitive business intelligence for business environment we found while analyzing the data. While dealing with modeling processes we will use data mining techniques and visualization in addition to that we will also be using Artificial Intelligence, Machine learning, cognitive computing and cognitive analytics. Which then useful in automated decision-making management for future growth. Cognitive analytics try to mimic the human brain and draw inferences from patterns and data and draw conclusion on the basis of evidences and reasoning on existing knowledge bases later insert this back into knowledge bases for future suggestion self learning feedback loop.

1. The business level raw data set can be a strategic resource only if we are able to find hidden, previously undiscovered information from it automatically and automatically suggest for future plan of action.
2. Managerial perspective by focusing on improving management decision-making system.
3. Technical perspective by focusing on tools supporting the processes associated with business intelligence in management perspective.

Methodology:

The methodology applied for Cognitive Business Intelligence And Analytics Performance Management for business will be validated through analysis of data set. The results from overall stage lead to minor refinements of the original framework and in addition to that will provide new research question for future research work.

The Concepts and Techniques Used Includes:

- Data Mining: Classification, Clustering, Association, Visualization, Summarization, Estimation, Link Analysis
- Machine Learning
- Artificial Intelligence
- Business Intelligence
- Business Intelligence and Analytics

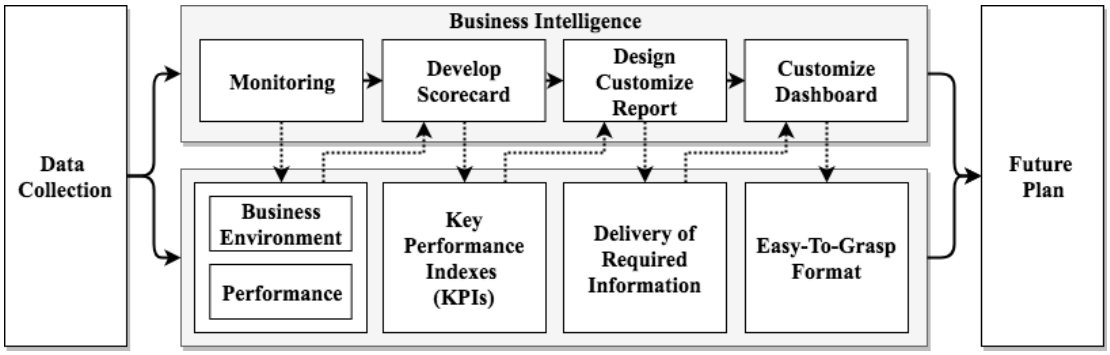

Fig. 1: Business Intelligence and Analytics Process

Use the acquired Tools, Software, and Infrastructure for

1. Deep understanding of system as well as knowledge hidden in the system
2. Note down – how data scattered across the business
3. Find out main process
4. Find out sub-process
5. Preparing data sets for both main and sub processes
6. Make Note of knowledge to be gained
7. Use of Business Intelligence systems
8. Results

It is very difficult task to select appropriate applications and tools in Business Intelligence and Analytics. Basic business intelligence and analytics require Data Warehousing (DW) and ETL tools, these tools allow making integration of different data source. That is not sufficient, for business intelligence require business intelligence tools that helps IT team to design data visualization as per user requirement. Data can be visualized through reports, dashboard, charts, require Business Intelligence and analytics platform to be accessed. Finally data analyst requires appropriate statistical as well as data mining tools to accomplish data analytic [4].

Need & Significance:

Understanding of organization in relation to their employees, customers, products, suppliers, services by leveraging every data touch point. Businesses are today seeking business transformation capabilities from IT providers. A Business Intelligence solution assists in creating accurate reports by extracting data from data source directly. Today with the help of Business Intelligence solutions eliminate the time consuming job of consolidating data manually. Business Intelligence can also allow managers to monitor their businesses. A Business Intelligence solution provides reports to manager's on-demand directly. This can reduce the scope of error by providing managers with accurate data to take better decisions on what is happening now as well as forecasting the future.

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